

Definition

This discussion refers to the anterior two-thirds of the tongue (oral tongue) visible on routine examination. The oral tongue is moist and pink with neither localized nor diffuse discoloration or ulceration. Filiform, fungiform, and circumvallate papillae are visible. There is normally a very thin "coat."

Technique

First examine the tongue within the oral cavity. Confirm the presence of all three types of lingual papillae. Check carefully for unusual size or coat. The coat is best evaluated in the posterior two-thirds of the oral tongue. Search for any areas of ulceration or discoloration. Now have the patient protrude the tongue. Briefly repeat the above examination and also evaluate the range of anterior tongue thrust. Refer to additional comments in Chapter 129 (The Oral Cavity and Associated Structures) and Chapter 65 (Cranial Nerve XII: The Hypoglossal Nerve).

The most important disease of the tongue is cancer. The technique for examining the tongue for cancer is described in Chapter 129.

Basic Science

The oral portion of the tongue derives from the first branchial arch. The skeletal muscles of the tongue are covered by a mucous membrane containing three types of papillae in humans. Filiform papillae are the multiple small structures over most of the dorsum of the tongue. Fungiform papillae are slightly redder nearer the surface and more numerous at the tip and margins of the tongue. Circumvallate papillae, 8 to 12 in number, are larger and lie at the junction of the oral and pharyngeal tongue.

The tongue functions to assist in taste, mastication, deglutition, and speech. Each type of papilla houses taste buds that convey the different tastes of sweet, sour, bitter, and salty. Specialized techniques beyond the physical examination are necessary for evaluation of taste.

Many references are made to the coat of the tongue. One interpretation of the formation of the coat is that dying stratified squamous epithelial cells become hydrated and white. The thickness of this coat is largely dependent upon the balance between the rate of production of epithelial cells and the rate at which the dead ones are worn away by activity such as eating and talking. If a disease interferes with the proliferation of cells, the hydrated dead epithelial cells of the tongue will not be replaced as fast as they wear off and there will be no coat. If cellular proliferation is normal but the usual removal processes decrease, there will be a thick coat.

Clinical Significance

In the past the tongue has been such a major object of interest that many adult patients reflexly stick out their tongues as soon as the examiner displays a flashlight or tongue blade. This focus evolved largely to determine if the coat was thick, or if the patient had a coatless, beefy-red tongue. Since the major wear comes from eating and talking, a thick coat indicates that the patient is neither eating nor talking very much and therefore must be sick. Since the patient already knows this, the observation adds little.

The standard descriptions of the tongue in pernicious anemia are that it is beefy-red, sore, and smooth with papillary atrophy. This description covers two separate developments, both rare nowadays. Inflammation of the tongue with redness and soreness may occur at any time in vitamin B₁₂ or folic acid deficiency. It is usually transitory and seldom seen. Atrophy of the papillae with a resulting smooth tongue is a very late development. The diagnosis is nearly always made much earlier. A much more likely cause of a smooth tongue is false teeth. What is important is that if the deficiency of folic acid or vitamin B₁₂ is severe enough to produce anemia, there will be no coat on the tongue, which may appear quite normal otherwise.

The tongue is severely affected by other vitamin deficiencies. These are much less common since the advent of fortified foods. When a vitamin deficiency does occur, it is very likely to be multiple. Therefore the distinction between the black tongue of niacin deficiency (pellagra) and the magenta tongue of riboflavin deficiency are not likely to be of diagnostic importance. Deficiencies of niacin, riboflavin, pyridoxine, folic acid, or vitamin B₁₂, resulting from poor diet or from the administration of antagonists, may cause a sore, beefy-red tongue without a coat. In the chronic vitamin deficiency state, the tongue may become atrophic and smooth. Chronic iron deficiency may also lead to an atrophic, smooth tongue.

The buccal mucosa may participate in an inflammatory reaction due to a vitamin deficiency. An increasingly common cause of an acutely sore and ulcerated mouth and tongue is the administration of anticancer drugs such as methotrexate, which antagonizes folic acid, or 5-fluorouracil, which directly interferes with production of DNA and therefore with the proliferation of cells.

Vitamin deficiency, particularly of riboflavin, can also cause cheilosis or fissuring at the corners of the mouth. A more common cause of cheilosis, however, is the drooling occasioned by excessive folding at the corners of the mouth in elderly patients with dentures and atrophy of the gums.

Patients receiving antibiotics on a chronic basis, particularly if immunocompetence is depressed by disease or immunosuppressive drugs, are particularly likely to develop moniliasis with stomatitis. It is characterized by snowy white fungal patches.

Prolonged penicillin use can lead to infection with *Aspergillus niger* and a characteristic painless brown or black "hairy" tongue with long, thickened, and fused papillary tufts.

Another lead to systemic disease from examination of the tongue is macroglossia. This should be examined not only visually but also by palpation. True macroglossia will not only elevate the tongue but will bulge beneath the mandible, displacing the sublingual glands. This finding may be an obvious and major clue to amyloidosis. Macroglossia may also occur in acromegaly or myxedema but is a rather unimportant finding among the many other manifestations of those diseases.

Minor abnormalities of the tongue deserve some mention. There is an anomaly of no significance in which the furrows in the tongue are deeper than usual without disturbance in the arrangement of the papillae. This is called "furrowed" or "scrotal" tongue. Another abnormality is the so-called geographic tongue in which there are areas of atrophy of the filiform papillae with normal fungiform papillae. These areas are separated by white lines of hyper-

trophied filiform papillae. The patches may wander or remain static. The condition usually appears early in life and is of obscure etiology. An article by Merrill and Kruger provides 30 excellent color photographs of various clinical disorders of the tongue.

References

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